

**LOW-NOISE LOOP FILTER FOR A PHASE-LOCKED LOOP SYSTEM****ABSTRACT OF THE DISCLOSURE**

[0038] A loop filter device and method for a phase locked loop ("PLL") circuit, which locks a frequency of a signal to a reference frequency, are disclosed. The loop filter includes an integral path circuit and a new proportional path circuit cascaded together in series and further includes a summer. The integral path  
5 circuit integrates a loop filter input signal to provide an integrated signal that tracks an overall input signal level. The new proportional path circuit differentiates the integrated signal to provide a proportional signal based on a detected instantaneous phase difference for locking a frequency of a signal for a phase locked loop (PLL) circuit to a reference frequency. The summer receives  
10 as inputs and sums the integrated signal and the proportional signal to provide a low-noise loop filter output signal.